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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/818,849	03/28/2001	Philippe R. Morin	9432-000132	1646

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EXAMINER

LEWIS, MICHAEL A

ART UNIT	PAPER NUMBER
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2655

DATE MAILED: 05/12/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/818,849

Applicant(s)

MORIN, PHILIPPE R.

Examiner

Michael A Lewis

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2-3
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1 – 16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. As per claims 1, 2, 12 and 15, the term “absolute likelihood” should actually be “absolute value of log likelihood”, since otherwise the maxima thereof should be considered locations of the spotted words rather than the minima used by the applicant.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1,2,6,7,8,9,10,11 & 15 are rejected under 35 U.S.C. 102(e) as being anticipated by Laurila et al. (EP 1 020 847 A2).

Regarding independent claim 1, Laurila et al. disclose a method/system for spotting words in a speech signal, the method comprising the steps of: generating [by the use of speech recognizer] a first recognition score based on the speech signal and a lexicon entry for a first word, the first recognition score tracking an absolute likelihood that the first word is in the speech signal (Col 6, Lines 44 – 49); estimating a first background score [a background noise model] based on the first recognition score (Col 6, Lines 49 – 56); and calculating a first confidence score based on a matching ratio between a first minimum recognition value and the first background score, the first confidence score tracking a noise-corrected likelihood that the first word is in the speech signal (Col 6, Lines 57 – Col 7, Lines 17) [*Laurila et al. describe that the probability used to determine the confidence is calculated using the recognized word that is compared (inherently this can be expressed as ratio) with the probability produced by a background noise model*] (Col 6, Line 48 – 54). [*Laurila et al. describe the probability [likelihood] that the recognized word is only background noise or a word*].

Regarding claims 2, Laurila et al. disclose the step of averaging the first recognition score over a predetermined period of time (Col 7, Lines 40 – 47).

Regarding claim 6, Laurila et al. disclose the step of comparing the first confidence score to a predetermined confidence threshold, the first word being in

the speech signal when the first confidence score exceeds the predetermined confidence threshold (Col 7, Lines 3 –9).

Regarding claim 7, Laurila et al. disclose the step of spotting a second word in the speech signal (Col 7, Lines 36 – 42).

Regarding claim 8, Laurila et al. disclose the steps of: generating a second recognition score based on the speech signal and a lexicon entry for a second word, the second recognition score tracking an absolute likelihood that the second word is in the speech signal (Col 7, Line Lines 45 – 55); estimating a second background [a background noise model] score based on the second recognition score (Col 6, Lines 49 – 56; Col 7, Lines 45 – 55); and calculating a second confidence score based on a matching ratio between a second minimum recognition value and the second background score, the second confidence score tracking a noise-corrected likelihood that the second word is in the speech signal. *[Laurila et al. describe that the probability used to determine the confidence is calculated using the recognized word that is compared (inherently this can be expressed as ratio) with the probability produced by a background noise model]* (Col 6, Line 48 – 54; Abstract; Col 7, Lines 40 – 55). *[Laurila et al. describe the probability [likelihood] that the recognized word is only background noise or a word].*

Regarding claim 9, Laurila et al. disclose the step of comparing the second confidence score to the predetermined confidence threshold, the second word being in the speech signal when the second confidence score exceeds the predetermined confidence threshold (Col 7, Lines 50 – 55; Col 7, Lines 5 - 17).

Regarding claim 10, Laurila et al. disclose the steps of: determining whether the first word and the second word correspond to a common time period [*The process of DTW ensures the two words are evaluated over a common time period*] within the speech signal (Col 8, Lines 43 – 47); and selecting between the first word and the second word based on the first confidence score and the second confidence score when the first word and the second word correspond to the common time period [*Laurila et al. describes the use of DTW to compare the results of the first and second recognition scores within a common time period*](Col 8, Lines 20 – 24).

Regarding claim 15 and 11, Laurila et al. disclose a word spotting system comprising: a speech recognizer for generating recognition scores based on a speech signal and lexicon entries for a plurality of words, the recognition scores tracking absolute likelihoods that the words are in the speech signal (Col 6, Lines 44 – 49); and a spotting module for estimating background scores based on the recognition scores (Col 6, Lines 49 – 56) ; said spotting module calculating confidence scores on a frame-by-frame [*time window or interval of time*] basis

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based on matching ratios between minimum recognition values and the background scores, the confidence scores tracking noise-corrected likelihoods that the words are in the speech signal (Col 7, Line 47, Col 8, Lines 25 – 30; Col 6, Line 48 – 54). *[Laurila et al. describe the probability [likelihood] that the recognized word is only background noise or a word].*

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 3, 12 & 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Laurila et al. (EP 1 020 847 A2) in view of Modi et al. (US 6125345).

Regarding claims 3,12 & 16, Laurila et al. disclose the steps/module of/for:
dividing the first minimum recognition value by an average value for the first
recognition score over a predetermined period of time such that the matching
ratio results, the average value defining the first background score [*Laurila et al.
describe the use of calculating a probability for a word which is compared with a
probability produced by a background noise to determine the confidence value.
The confidence value is compared to a threshold value to determine the certainty
of a word. This certainty can be expressed as a comparison (inherently this can
be expressed as ratio (division)). In addition, this operation is done over a
window period (time period) and it is well understood that this will be an average
value over a certain period*]. Laurila et al. do not teach normalizing the matching
ratio of the first confidence score. However, Modi et al. teach the use of
normalizing confidence scores, including a first confidence score in a speech
recognition system with multiple confidence measures (Abstract). Normalizing is
used by the speech recognition system to allow otherwise independent confident
measures to be integrated.

Therefore, it would have been obvious to one of ordinary skill at the time of the
invention to modify Laurila with the use of normalizing the confidence measures
as taught by Modi et al. since it would allowed otherwise independent confident
measures to be integrated for improved speech recognition system.

6. Claims 4 & 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Laurila et al. (EP 1 020 847 A2) in view of Modi et al. (US 6125345) and further in view of Junkawitsch (US6505156).

Regarding claims 4 & 13, Laurila et al. do not disclose the step of locating a minimum value within the first recognition score. However, Junkawitsch et al. teach the use of a minimum score as a means to determine the optimal score in continuous speech. The minimum confidence score is used to determine the start of the keyword that is necessary for improved keyword recognition.

Therefore, it would have been obvious to one of ordinary skill at the time of the invention to modify Laurila with the use of the minimum confidence measures as taught by Junkawitsch et al. since it would have been used to determine the keyword start which is necessary for keyword recognition.

7. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Laurila et al. (EP 1 020 847 A2) in view of Modi et al. (US 6125345) ^{and Junkawitsch} and further in view of Chan (US6032114).

Regarding claim 5, the modified Laurila et al. do not disclose the step of searching a predetermined range of the first recognition score for the minimum

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value such that local minimums are excluded from the confidence calculations. However, Chan et al. teach an apparatus/method for estimating the noise level by obtaining the smallest of five minimums up to a certain time point [within a predetermined range] (Col 6, Lines 25 – 30). Obtaining and outputting the minimum noise level is essential in determining the true background noise level [freed of the speech signal] that is essential in modeling a noise reduction filter.

Therefore, it would have been obvious to one of ordinary skill at the time of the invention to modify the modified Laurila by selecting the minimum among many local minimums as taught by Chan et al. since it would have been helped in determining the true background noise level that is essential in modeling a filter to reduce noise in the speech signal.

8. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Laurila et al. (EP 1 020 847 A2) in view of Modi et al. (US 6125345) ^{and Jankawitsch} and further in view of Chan (US6032114).

Regarding claim 14, the modified Laurila et al. do not disclose the step of searching a predetermined range of the first recognition score for the minimum value such that local minimums are excluded from the confidence calculations. However, Chan et al. teach an apparatus/method for estimating the noise level

by obtaining the smallest of five minimums up to a certain time point [within a predetermined range] (Col 6, Lines 25 – 30). Obtaining and outputting the minimum noise level is essential in determining the true background noise level [freed of the speech signal] that is essential in modeling a noise reduction filter.

Therefore, it would have been obvious to one of ordinary skill at the time of the invention to modify the modified Laurila by selecting the minimum among many local minimums as taught by Chan et al. since it would have been helped in determining the true background noise level that is essential in modeling a filter to reduce noise in the speech signal.

Conclusion

1. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Miet et al (U.S. Patent 6138094)

Thelen et al. (U.S. Patent 6526380)

Takebayashi et al. (U.S. Patent 5761639)

Acero et al. (E.P. Patent 0694906)

Gupta et al. (U.S. Patent 6138095)

Gillick et al. (U.S. Patent 6029124)

Jiang et al. (U.S. Patent 6539353)

Hon et al. (U.S. Patent 6571210)

Hon et al. (U.S. Patent Application 20010018654)

Epstein (U.S. Patent 5465317)

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael A. Lewis whose telephone number is 703 305-8730. The examiner can normally be reached on Monday through Friday, 8:30 am – 5 pm.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, To Doris can be reached on (703) 305-4827. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Lewis A Michael
Examiner
Art Unit 2655

Mal

5/1/2004



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